Alaska Department of Fish and Game
Division of Wildlife Conservation
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Population Ecology and Spatial Dynamics of Wolves Under Intensive Management in the Nelchina Basin, Alaska

Howard N. Golden

Research Performance Report
1 July 2003–30 June 2004
Federal Aid in Wildlife Restoration
Grant W-33-2, Project 14.21

This is a progress report on continuing research. Information may be refined at a later date.

FEDERAL AID
ANNUAL RESEARCH PERFORMANCE REPORT

ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF WILDLIFE CONSERVATION
PO Box 25526
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PROJECT TITLE: Population ecology and spatial dynamics of wolves under intensive management in the Nelchina Basin, Alaska

PRINCIPAL INVESTIGATOR: Howard N. Golden

COOPERATORS:

FEDERAL AID GRANT PROGRAM: Wildlife Restoration

GRANT AND SEGMENT NR: W-33-2

PROJECT NR: 14.21

WORK LOCATION: Nelchina Basin, Game Management Unit 13

STATE: Alaska

PERIOD: 1 July 2003–30 June 2004

I. PROGRESS ON PROJECT OBJECTIVES SINCE PROJECT INCEPTION

OBJECTIVE 1: Determine the year-round prey selection patterns and kill rates of wolf packs relative to varying densities and distributions of prey — primarily moose and caribou — in and near the core calving areas.

We continued monitoring kill rates and diet using VHF telemetry and GPS telemetry systems, stable isotope analysis, and body composition measurements. Two to four wolves from each of several packs were radiocollared. We have regularly located all collared wolves and backtracked the movements of the GPS-collared animals to determine their use of different prey items. For captured wolves, we sampled blood for stable isotope analysis and conducted deuterium water dilution for analysis of body condition before and after calving.

OBJECTIVE 2: Investigate wolf movements and spatial relationships with prey.

We used VHF and GPS radio collars to monitor the movements of 2–4 wolves in each of several packs. We investigated spatial analysis techniques to measure wolf movements relative to the availability of moose and caribou.

OBJECTIVE 3: Evaluate diet and body composition of wolves relative to prey availability.

Stable isotope and body condition analysis focused on 3 periods relative to prey (moose and caribou) availability: (1) April — pre-calving and before caribou arrive in the area, (2) July

— post-calving for both prey species, and (3) October — autumn/early winter after caribou have left the area. We sampled as many wolves as possible during each capture period.

OBJECTIVE 4: Estimate wolf density relative to varying prey densities.

We conducted a density estimate using a sample-unit probability estimator (SUPE) of wolves in western Unit 13 and small portions of 13B and 13C in March 2002. Snow conditions were inadequate to conduct the SUPE in 2003. A SUPE was not conducted in 2004 due to budget constraints and the initiation of a land-and-shoot wolf control program. Estimates of moose and caribou densities were conducted by cooperators and other department staff.

OBJECTIVE 5: Estimate production, survival, and recruitment of wolves relative to varying prey densities.

During April captures, we used ultrasound techniques to examine pregnancy and the number of fetuses in female wolves. We also monitored den sites to estimate pup production, and we documented loss of wolves from dispersal, natural mortality, and harvest by humans.

II. SUMMARY OF WORK COMPLETED ON JOBS IDENTIFIED IN ANNUAL PLAN THIS PERIOD

JOB 2: Capture and Handling

We reduced our effort to capture wolves this performance period because: (1) a wolf control program using aerial- and ground-based efforts took place during the winter of 2003–2004 and (2) we used all available funds to purchase new, state-of-the-art GPS radiocollars that are scheduled to be deployed in the following performance year. We bought 18 Tellus GPS collars from Telemetry Solutions for $47,500. During this performance period, we captured 9 wolves (8 males and 1 female) among 4 packs. There were no capture-related mortalities. Captures took place on 15–16 July and 19 November 2003. Of the 9 wolves captured, 2 were new captures and 7 were study animals that had been captured previously. We deployed GPS collars (Televilt/Telemetry Solutions) on 4 of the 5 wolves captured in July and VHF collars (Telonics) on the rest. We attempted to replace all GPS collars on wolves in the study area during November captures with VHF collars because of the impending wolf control effort. However, we were unable to capture all GPS-collared wolves. For each wolf we measured weight (with an electronic load cell) and body size, estimated age (based on tooth wear), applied ear tags and a radio collar, extracted blood for stable isotope analysis as well as for potential DNA and disease analysis, biopsied a fat sample for fatty acid analysis, and noted general physical condition.

JOB 3: Prey Selection Patterns and Kill Rates

Location data collected by the GPS collars were remotely downloaded from the air and used to backtrack the movements and kill-site use by the wolves during the previous week. Collars deployed from July to November 2003 were set to gather locations every ½ hour each day. We were able to backtrack the movements of collared wolves with relatively few gaps in their travel routes. We followed wolf travel routes and recorded their visits to sites of freshly killed or older carcasses of moose or caribou. We also recorded kill sites discovered during telemetry flights of the VHF collars. GPS download and backtracking flights took 1–2 days

to complete. Conventional VHF locations were obtained for most wolves at 2- to 4-week intervals.

JOB 4: Movements and Spatial Relationships with Prey

The GPS data downloaded remotely or directly from collars and data gathered through conventional VHF collars were compiled for comparative analyses with the movements of radiocollared moose and caribou. Data were collected on the schedule described above.

JOB 5: Diet and Body Composition

We collected blood, hair, and vibrissae samples from each of the wolves when captured. These samples were prepared in the lab for analysis of the presence of carbon and nitrogen isotopes that have specific signatures for moose, caribou, and other potential prey. Fat tissue samples were taken and stored for future fatty acid analysis. We continued to prepare a manuscript on the results of the body composition research (see Job 8 and section IV).

JOB 6: Density Estimation

A SUPE was not conducted in 2004 due to budget constraints and the initiation of a land-and-shoot wolf control program.

JOB 7: Production, Survival, and Recruitment

Out of 9 wolves monitored during this performance period, 2 are still alive, 1 was snared, and 7 were taken under the land-and-shoot control effort.

JOB 8: Publications and Meetings

I coauthored a manuscript now in press, another manuscript in preparation, and a poster paper (see below).

III. ADDITIONAL FEDERAL AID-FUNDED WORK NOT DESCRIBED ABOVE THAT WAS ACCOMPLISHED ON THIS PROJECT DURING THIS SEGMENT PERIOD

I supervised the Fish and Wildlife Technician (FWT) positions for the Region II Research Section assigned to the Anchorage office. These positions provided support to this project during the performance period. This duty, which I have conducted since March 1995, involves hiring, supervising, and coordinating the work of a FWT IV and FWT III. Both positions are 11-month permanent-seasonal (P-S). In addition, I am responsible for hiring and supervising other temporary technicians or interns to assist seasonally as needed. During this performance period, I wrote evaluations and handled all personnel issues for these positions.

IV. PUBLICATIONS

Becker, E. F., H. N. Golden, and C. L. Gardner. 2004. Using probability sampling of animal tracks in snow to estimate population size. Pages 248–270 *in* W. L. Thompson, editor. Sampling rare or elusive species: concepts and techniques for estimating population parameters. Island Press, Washington, D. C., USA.

Hilderbrand, G. V., and H. N. Golden. *In prep*. Body composition of free-ranging wolves. Journal of Mammalogy 000: 000–000.

Hilderbrand, G. V., and H. N. Golden. 2004. Body composition of free-ranging wolves in the Nelchina Basin, Alaska: preliminary results. Poster paper presented to the 2004 Annual Meeting of the Alaska Chapter of The Wildlife Society, Girdwood, Alaska.

V. RECOMMENDATIONS FOR THIS PROJECT

I recommend continuing this project and expanding its scope to look more closely at the spatial and predation relationships among wolves, brown bears, and moose using the Tellus collars as an aid and to explore the potential relationships between human winter activity and wolf-prey activity and spatial relationships. Our ability to examine these relationships in order to build a more comprehensive predator-prey-habitat model for the Nelchina Basin will depend upon available funding and personnel as well as predator control efforts in the area. Reexamination of the efficacy of accomplishing all objectives may be necessary.

VI. APPENDIX

VII. PROJECT COSTS FOR THIS SEGMENT PERIOD

FEDERAL AID SHARE $ 104,355 STATE SHARE $ 34,786 = TOTAL $139,141

VIII. PREPARED BY:

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APPROVAL DATE: _____